

ORIGINAL

Application Based on

Docket **83320F-P**
Inventors: Richard N. Blazey
Customer No. 01333

A METHOD AND SYSTEM FOR HEIRARCHICAL DATA ENTRY

Commissioner for Patents,
ATTN: BOX PATENT APPLICATION
Washington, D. C. 20231

Express Mail Label No.: EL 656 971 691 US

Date: December 21, 2001

A METHOD AND SYSTEM FOR HIERARCHICAL DATA ENTRY

FIELD OF THE INVENTION

The present invention is directed to the field of data entry into a database and, more particularly, to a method and system of data entry by selecting
5 pre-defined categories arranged in a hierarchical manner on a computer.

BACKGROUND OF THE INVENTION

Data entry into the fields of a computer database can be a time-consuming and tedious process. Each item in the database may require a clerk using a keyboard to make entries relating to large number of categories. An
10 example of such a database may be found in the real estate industry where there is a need to categorize the thousands of houses in its respective databases with respect to multiple characteristics (size, color, type of exterior, age, appliances, number and type of rooms, to pick but a few examples) so that they may easily be found by potential buyers. Currently for this industry, this categorization is
15 limited to a practical number of database fields to keep the time needed to enter the data within practical limits. Certain characteristics of the house are also described in written summaries prepared by each agent. These summaries are as unique as the agent that prepared them and may describe the same characteristics in different words or may not describe at all some minor characteristics of interest
20 to some buyers (e.g., corner lot, tree in front yard). When these summaries are later used to catalog houses in a database, this lack of uniformity in terminology may mean that searching does not always return all the houses that may interest a buyer, or may return incorrect or inappropriate results.

Commonly assigned and co-pending US patent application entitled
25 A METHOD AND SYSTEM FOR CATALOGING IMAGES (Attorney docket No 81171/F-P) Serial No. 09/640,938 filed on August 17, 2000 to Squilla, et al., addresses some aspects of these problems by providing iconic representations of key categories such as, as applied to the real estate example at hand, number of bedrooms, number of bathrooms, appliances included etc. The approach of
30 Squilla, et al. simplifies both data entry and retrieval by eliminating the need to

type entries and also improves the uniformity in that there is only one choice to describe a particular characteristic. However, where a very large number of categories is required for a complete and accurate description, the icons quickly become difficult to recognize as their number increases past a few dozen.

5 When it is necessary to retrieve items from a computer database where many choices are possible, it is known to use a hierarchical series of menus of selection items where levels of menus appear sequentially as needed. For such a system, see US patent 5,784,069 to Morimoto, et al. which discloses a hierarchical series of linked menu levels used to select items related to location in
10 an on-board vehicle navigation system. However, this approach does not address the need where a large number of characteristics must be entered into a database in order to fully describe an item in the database

 Thus there remains a need for a method for faster and easier and more consistent data entry to describe complex items so that they may be
15 accurately searched in databases with a great many more fields than is practical if each field must be entered using a keyboard.

SUMMARY OF THE INVENTION

 In accordance with one aspect of the present invention, there is provided a computer software product comprising a computer readable storage
20 medium having a computer program which when loaded into a computer having a searchable database running thereon causes the computer to perform the following steps of providing a first display screen having a plurality of first selection items; enabling a user to select one of the first selection items, which results in a second display screen having a plurality of second selection items; enabling the user to
25 choose one of the second selection items for entering into a database or going to a next display screen for presenting a next set of selection items; and enabling the user to repeat the above steps until a selection has been made for entering at least one of the selection items into a predetermined field of the database.

 In accordance with another aspect of the present invention, there is
30 also provided a method of entering data into a searchable database, comprising the

steps of providing a first display screen having a plurality of first selection items; selecting one of the first selection items, which results in a second display screen having a plurality of second selection items; choosing one of the second selection items for entering into a database or going to a next display screen for presenting a
5 next set of selection items; and repeating the above steps until a selection has been made for entering a selection item into a predetermined field of the database.

In accordance with yet another aspect of the present invention, there is also provided a system for entering data into a searchable database, the database having at least one hierarchical data entry path, the path comprising at
10 least two data entry levels, wherein each level has a plurality of selection items, one of the selection items being used for selecting the second level.

In accordance with still another aspect of the present invention there is provided a data entry device for entering data into a searchable database running on a computer, comprising a data entry module having a user interface
15 displaying at least one hierarchical data entry path, the path comprising at least two data entry levels, wherein each the level has a plurality of selection items, one of the selection items being used for selecting the second level; a digital image capture and storage module able to capture and store a plurality of images; and a processor able to tag at least one of the stored images as being associated with at
20 least one of the selection items.

In accordance with yet another aspect of the present invention there is provided a method of entering data using a digital camera that is to be downloaded into a searchable database running on a computer, comprising the steps of capturing an image using said digital camera; entering a selection item
25 into a predetermined field of said database from a first set of selection items for said digital image; and down loading said digital images and associated data into said database.

The above, and other objects, advantages and novel features of the present invention will become more apparent from the accompanying detailed
30 description thereof when considered in conjunction with the following drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the detailed description of the preferred embodiments of the invention presented below, reference is made to the accompanying drawings in which:

5 Fig. 1 is a schematic diagram of a system for use in practicing the present invention;

Fig. 2a – 2d are computer display screens illustrating the operation of a software implementation of the present invention;

10 Fig. 3 is a schematic diagram illustrating the hierarchical structure the present invention; and

Fig. 4 is a depiction of a data entry device made in accord with the present invention.

DETAILED DESCRIPTION OF THE INVENTION

It is the purpose of this invention to make it faster and easier to
15 catalog complex items so that they may be searched in databases with a great many more fields than is practical if each field must be individually entered using a keyboard. It is another purpose to make the catalog tool easier to use for storage and retrieval of items from a database. Still another purpose of this invention is to increase the uniformity with which characteristics are entered into a database.

20 The present invention provides that data entry is accomplished by providing selection items, such as icons, on a computer data entry screen arranged in a tree hierarchy using multiple data entry levels with one data entry level per screen. In this way a great multiplicity of selection item choices can be accessed using just a few clicks of a mouse. The total number of fields that can be
25 characterized by the method illustrated may be understood by referring to the formula below:

$$N_{icons} = \sum_{i=0}^{N_{levels}} N_0 R^{i-1}$$

In the formula, N_{icons} is the total number of icons in the tree hierarchy, N_0 is the number of selection items (icons) on each data entry level
30 screen, N_{levels} is the number of levels in the hierarchy and R is the number of

branches on level N for each selection item on the previous level (N-1) . As an example, with N_0 set at 3 and R set to 5 and $N_{levels} = 3$ the formula calculates that the hierarchy contains 93 icons any of which can be accessed with just 3 mouse clicks. A more general form of the formula is shown below where the number of
5 selection items N on each level may be different.

$$N_{icons} = \sum_{i=1}^{N_{levels}} N_{i-1} R_{i-1}$$

Referring now to Fig. 1, there is illustrated a system 10 for use in entering data in a real estate database which incorporates the data entry method of the present invention. The system includes a computer 15 for processing data and
10 information. The computer 15 also includes an appropriate processor and memory storage for the running of software programs and storing digital data as is customarily carried out by computers. In the embodiment illustrated, computer 15 is a personal computer having a display device 20 which in the embodiment shown is a CRT. The computer 15 also includes input devices 25 and 30 for
15 entering of data into the computer 15 by the user. In particular, input device 25 is a keyboard and input device 30 is a mouse. However, it is to be understood that any input device or means may be employed, for example, but not by way of limitation, a touch screen or a voice input system. A wireless input device, such as a wireless hand-held PDA could easily be interfaced to such a system as well.
20 A scanner 35 is provided for scanning of hard copy images of houses, real estate properties or other items to be entered into the database. The scanned images captured by scanner 35 are digitized and forwarded to the computer 15 as is well known in the art. In addition a digital camera 40 or image memory card reader 45 may also be connected to the computer 15 for the direct input of digital images of
25 real property. Computer 15 is also provided with appropriate communications hardware and software, as is well known in the art, for allowing communication with third parties. In the embodiment illustrated, the communications hardware and software allows communication to an internet service provider ISP 50 which in turn allows communication with the internet 55. Data recorded in the database
30 regarding real properties for sale are uploaded from computer 15 to the real estate

web site 60 where this information may be accessed by real estate customers 65 and 70 who run searches on the database also using computers from a remote location.

The system of Fig. 1 serves only to illustrate one use of the data entry method of the present invention. It will be understood that the practice of the invention is not limited to this example, and the data entry method of the invention may be applied to any computer database where the number of data fields required to be entered is large and lend themselves to the hierarchical method herein disclosed. Such a computer database could be running not only on a networked system as shown in Fig. 1, but also on a variety of stand-alone devices such as a personal computer, PDA, hand-held or palm-top computer. Even the display and the keys on a cell phone could be adapted to such a method of data entry.

Figs. 2a – 2d show selected computer display screens of a preferred embodiment of the data entry method of the present invention implemented in a simple software program for use in a real estate sales operation. For convenience, in the illustration of Figs. 2a – 2d, selection items are represented by selection buttons labeled with text. It will be appreciated, however, that selection items may also be represented by selection buttons which have an image or other graphic (such as graphical representation of an appliance) on them to indicate their purpose. A mixture of selection buttons, some labeled with text and some with a graphic image could also be used. Selection buttons may also have any shape which is convenient, including an overall shape indicative of their use (such as, for example, the shape of an appliance). Other types of well-known selection items for hierarchical data entry into a computer where selection of an item causes branching to another screen may also be adapted to this method. Examples include, but are not limited to, linked blocks of text or symbols, or various kinds of active regions on a screen which, when selected, cause an action such as branching to another page or level.

Fig. 2a shows an initial data entry screen 75 including an image of a house 80 for which data is to be entered. Data entry selection items are represented by selection buttons 85, 90 and 95 having labels "Interior" 100, "Exterior" 105 and "Lot/Location" 110 respectively, relating to particular features of the house 80. The data entry level of the screen is shown by the numeral 115 in indicator window 120. As data entry selections are made, window 125 shows the accumulating data entry string 130 so that the user can keep track of items already selected for entry. The label "Done" 135 appearing on selection button 140 is used to indicate there is no additional choice to be made using this selection button at the particular data entry level. Selection button 145 with label "Reset" 150 is used to return to the top of the tree for a new entry relating to the house. Selection button 155 with label "Next Address" 160 resets the system for data entry of different house in the database.

Proceeding now with the operation of the embodiment illustrated, for example, when the "Interior" selection button 85 is selected, the system branches to a second level of data entry shown in Fig. 2b by computer data entry screen 165. In Fig. 2b the labels on the selection buttons have changed to four selection items relating to the interior features of the house 80. In Fig. 2b, these four interior features are represented by selection buttons 85, 90, 95 and 140 with labels "Appliances" 170, "Bedrooms" 175, "Utilities" 180 and "Bathrooms" 185 respectively. Selecting, for example, the selection button 85 labeled "Appliances" causes the system to branch to a third level (not shown) where the selection button labels have changed again and relate to types of appliances. The data entry process for house 80 continues in a like manner until selection of an item no longer brings up additional choices corresponding to the last data entry level of a particular branch of the data entry tree hierarchy. Fig. 2c shows the last data entry screen 190 for the entry branch relating to appliances. In Fig. 2c it is shown that the selection item "dishwasher" has been added to the data entry string 130 for this house. Selection buttons 85, 90, 95 and 140 in Fig. 2c are all labeled "Done" indicating that the data entry system is at the end of the hierarchical tree for the

"Appliances" category and no additional selections are to be made for this category. Selection of the selection button 145 labeled "Reset" in Fig. 2c will now return the user back to a higher level in the tree so that additional information about the house may be entered. For example, once data about appliances has
5 been completed, the "Reset" selection button will return the system to screen 165 Fig. 2b) where data may be entered for another attribute such as "Utilities". Fig. 2d shows an example of the final data entry screen 195 where data entry for an entire house has been completed and the completed data entry string 130 is shown in window 125. On screen 215, selection buttons 85, 90, 95 and 140 now
10 are all labeled "Done" indicating there is no additional data to be added for the house 80. Selection button 145 is now labeled "Enter". When selection button 145 is selected, all the data for house 80 is transferred by means of methods well known by those skilled in the art into a conventional database such as Microsoft Access©, or any suitable computer database, running on essentially any
15 computing platform which will support the software. In the real estate example provided, such a database has various fields corresponding to the data entry categories of "Interior", "Exterior" and "Lot/Location" and their subcategories. The step of data entry into the database will in some instances cause the entering of more than one selection item into the same field of the database. For example,
20 more than one entry for types of appliance may be entered into the "Appliance" field for a house where more than one appliance is being offered.

When data entry for a particular house has thus been accomplished and the data transferred into a database, selection of the selection button 155 on screen 195 labeled "Next Address" starts the data entry system over again at the
25 beginning for the next house to be entered.

It will be understood that the hierarchical data entry method of the present invention may also be adapted to many other types of database structures. For example, a real estate database might alternatively be organized according to which features in the house are associated with a particular floor in the house. The

hierarchical data entry would then simply branch from floor to floor, allowing entry of such items as rooms on that floor, types of appliances on that floor, etc.

Once data has been entered into the database, then data may also of course be retrieved from the database using any of the well known methods of data retrieval from a database including the construction of a retrieval search query using a hierarchical system analogous to that disclosed here for data entry. Thus a user wishing to search the database would, by means of a series of hierarchical screens, enter the characteristics (number of rooms, type of siding, lot size, etc) of the type of house being sought and the database would return and display the choices fitting the description.

In order to make more clear the relationship between the various data entry level screens of the embodiment illustrated in Figs. 2a -2d, there is shown in Fig. 3 a schematic representation of the relationships between the data entry levels of the embodiment illustrated. In Fig. 3 the first data entry level 200 corresponds to the first data entry screen 75 of Fig. 2a, and the three data entry points 205, 210 and 215 correspond to the three selection items 85, 90 and 95 of the first screen of Fig. 2a. When selection item 205 is chosen, the entry system branches to the second data entry level 220, corresponding to the second data entry screen 165 of Fig. 2b where four new data entry points 225, 230, 235 and 240 corresponding to selection buttons 85, 90, 95 and 140 respectively are presented. When data entry point 225 is selected the system continues to branch as described earlier and the entry process continues until the last data entry level 245 for a particular branch has been reached. No data entry points are shown for level 245, which corresponds to the entry screen 195 of Fig. 2c. As described earlier, level 245 is the last data entry level for the particular branch of the entry tree and no additional choices need to be made at this level.

A particular screen layout, style and "look and feel" of the computer display screens has been illustrated for the embodiment shown in Figs. 2a - 2d, but it will be understood that essentially any style, screen layout, or "look and feel" that allows practice of the method of the invention may be employed.

For example, in the embodiment illustrated in Figs. 2a-2d the number of selection button selection items at each level of entry remains the same (four) and the labels on the selection buttons change when the system branches to another entry level. Other embodiments are also possible, however, for example where the numbers of selection items on the entry screens change from entry level to entry level, reflecting the number of entry items possible at that level. For example, if the "Appliances" selection button is selected on a screen which has three other selection choices (for a total of selection buttons), the system could next branch to an entry screen where six selection button choices, corresponding to a selection of six different appliances, could be provided. Also, instead of indicating that the last entry point on a branch of the entry tree has been reached by having the selection button label change to "Done", the system could simply have the selection button(s) disappear when there is no longer another choice to be made. Other variations and embodiments are also possible within in the scope of the invention.

The embodiment illustrated in Figs. 2a-2d is directed to data entry for an application in the real estate industry but it will be appreciated that the method of data entry of the present invention could be used for any number of other applications. Any computer database where items must be characterized by a large number of features would benefit from this method of data entry. The method would, for example, be useful for a database which contained other items other than real estate being offered for sale, such as, for example, automobiles or sporting equipment. Other examples where the method would be useful include databases in the insurance industry where the features of an item insured must be described, or the details of a particular insurance claim relating to an accident or other liability must be entered. The entry of particular kinds of medical data relating to a patient's medical record could also be well served by the method disclosed. The entry of data relating to the inventory of a large number of items, for example in a grocery store, is yet another example.

As described previously, a variety of data input devices may be used to practice the present invention. A particularly useful device for data entry comprises a digital camera where the digital camera is also used to capture images to be stored in the database. In Fig. 4 is a rear view of digital camera 250 useful for the real estate database application already discussed. Digital camera 250 has stored in memory (not shown) the hierarchical data entry tree described earlier and shown previously in Figs. 2a-2d. On camera 250, control button 255 is used to toggle between two modes of use for display 260 to (1) either display captured images for review, or (2) to display the data entry tree. As shown in Fig. 4, the display 260 is set for the mode of displaying the data entry tree. Button 282 labeled "Level" is used to navigate between levels in the data entry hierarchy. In the example shown in Fig. 4, the "Interior" level of the hierarchy with selection items 267, 270, 275 and 280, corresponding to various types of rooms found in the interior of a house is displayed on display 260. Buttons 285 and 290 are used to navigate between selection items displayed and determine which of the selection items is highlighted. In Fig. 4, the selection item 270 for the room type "Study" is shown highlighted. When using the camera, the real estate agent first captures a picture of the study, reviews the image using the image review mode of the display 260 and, if the image is acceptable, switches the camera to the data entry mode and selects the "Study" selection item 260 using navigation buttons 285 and 290. When the button 295 labeled "Enter" is activated, the image of the study is tagged in camera memory with its appropriate position in the data entry hierarchy. In like manner, pictures of other items in the data entry hierarchy may also be captured including, for example, other rooms, appliances, or a close-up of the exterior of the house. If it is not desired to take a picture of a particular item, but merely to indicate the presence of a particular feature in the house, a data entry alone can be made indicating that the feature is present in the house. Once all the data and pictures desired for a particular house have been recorded, the data from the camera is transferred to the computer (see part 15, Fig. 1) where the database is resident, and the images and data are entered into the database using known

prior art methods. When data for a house is later retrieved by a user of the database, the pictures associated with the features of the house will be made available for viewing (not shown). Once a particular house has been retrieved from the database, a series of selection buttons are presented, allowing the user to

5 access the pictures of the various features of the house. For example, the user is not only able to learn that a particular house has three bedrooms, or that it has a washer and drier, but will also be able to see pictures of the bedrooms, or pictures of the appliances.

It is to be understood that various other changes and modifications

10 may be made without departing from the scope of the present invention. The present invention being defined by the claims set forth below.

11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352
353
354
355
356
357
358
359
360
361
362
363
364
365
366
367
368
369
370
371
372
373
374
375
376
377
378
379
380
381
382
383
384
385
386
387
388
389
390
391
392
393
394
395
396
397
398
399
400
401
402
403
404
405
406
407
408
409
410
411
412
413
414
415
416
417
418
419
420
421
422
423
424
425
426
427
428
429
430
431
432
433
434
435
436
437
438
439
440
441
442
443
444
445
446
447
448
449
450
451
452
453
454
455
456
457
458
459
460
461
462
463
464
465
466
467
468
469
470
471
472
473
474
475
476
477
478
479
480
481
482
483
484
485
486
487
488
489
490
491
492
493
494
495
496
497
498
499
500
501
502
503
504
505
506
507
508
509
510
511
512
513
514
515
516
517
518
519
520
521
522
523
524
525
526
527
528
529
530
531
532
533
534
535
536
537
538
539
540
541
542
543
544
545
546
547
548
549
550
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
567
568
569
570
571
572
573
574
575
576
577
578
579
580
581
582
583
584
585
586
587
588
589
590
591
592
593
594
595
596
597
598
599
600
601
602
603
604
605
606
607
608
609
610
611
612
613
614
615
616
617
618
619
620
621
622
623
624
625
626
627
628
629
630
631
632
633
634
635
636
637
638
639
640
641
642
643
644
645
646
647
648
649
650
651
652
653
654
655
656
657
658
659
660
661
662
663
664
665
666
667
668
669
670
671
672
673
674
675
676
677
678
679
680
681
682
683
684
685
686
687
688
689
690
691
692
693
694
695
696
697
698
699
700
701
702
703
704
705
706
707
708
709
710
711
712
713
714
715
716
717
718
719
720
721
722
723
724
725
726
727
728
729
730
731
732
733
734
735
736
737
738
739
740
741
742
743
744
745
746
747
748
749
750
751
752
753
754
755
756
757
758
759
760
761
762
763
764
765
766
767
768
769
770
771
772
773
774
775
776
777
778
779
780
781
782
783
784
785
786
787
788
789
790
791
792
793
794
795
796
797
798
799
800
801
802
803
804
805
806
807
808
809
810
811
812
813
814
815
816
817
818
819
820
821
822
823
824
825
826
827
828
829
830
831
832
833
834
835
836
837
838
839
840
841
842
843
844
845
846
847
848
849
850
851
852
853
854
855
856
857
858
859
860
861
862
863
864
865
866
867
868
869
870
871
872
873
874
875
876
877
878
879
880
881
882
883
884
885
886
887
888
889
890
891
892
893
894
895
896
897
898
899
900
901
902
903
904
905
906
907
908
909
910
911
912
913
914
915
916
917
918
919
920
921
922
923
924
925
926
927
928
929
930
931
932
933
934
935
936
937
938
939
940
941
942
943
944
945
946
947
948
949
950
951
952
953
954
955
956
957
958
959
960
961
962
963
964
965
966
967
968
969
970
971
972
973
974
975
976
977
978
979
980
981
982
983
984
985
986
987
988
989
990
991
992
993
994
995
996
997
998
999
1000
1001
1002
1003
1004
1005
1006
1007
1008
1009
1010
1011
1012
1013
1014
1015
1016
1017
1018
1019
1020
1021
1022
1023
1024
1025
1026
1027
1028
1029
1030
1031
1032
1033
1034
1035
1036
1037
1038
1039
1040
1041
1042
1043
1044
1045
1046
1047
1048
1049
1050
1051
1052
1053
1054
1055
1056
1057
1058
1059
1060
1061
1062
1063
1064
1065
1066
1067
1068
1069
1070
1071
1072
1073
1074
1075
1076
1077
1078
1079
1080
1081
1082
1083
1084
1085
1086
1087
1088
1089
1090
1091
1092
1093
1094
1095
1096
1097
1098
1099
1100
1101
1102
1103
1104
1105
1106
1107
1108
1109
1110
1111
1112
1113
1114
1115
1116
1117
1118
1119
1120
1121
1122
1123
1124
1125
1126
1127
1128
1129
1130
1131
1132
1133
1134
1135
1136
1137
1138
1139
1140
1141
1142
1143
1144
1145
1146
1147
1148
1149
1150
1151
1152
1153
1154
1155
1156
1157
1158
1159
1160
1161
1162
1163
1164
1165
1166
1167
1168
1169
1170
1171
1172
1173
1174
1175
1176
1177
1178
1179
1180
1181
1182
1183
1184
1185
1186
1187
1188
1189
1190
1191
1192
1193
1194
1195
1196
1197
1198
1199
1200
1201
1202
1203
1204
1205
1206
1207
1208
1209
1210
1211
1212
1213
1214
1215
1216
1217
1218
1219
1220
1221
1222
1223
1224
1225
1226
1227
1228
1229
1230
1231
1232
1233
1234
1235
1236
1237
1238
1239
1240
1241
1242
1243
1244
1245
1246
1247
1248
1249
1250
1251
1252
1253
1254
1255
1256
1257
1258
1259
1260
1261
1262
1263
1264
1265
1266
1267
1268
1269
1270
1271
1272
1273
1274
1275
1276
1277
1278
1279
1280
1281
1282
1283
1284
1285
1286
1287
1288
1289
1290
1291
1292
1293
1294
1295
1296
1297
1298
1299
1300
1301
1302
1303
1304
1305
1306
1307
1308
1309
1310
1311
1312
1313
1314
1315
1316
1317
1318
1319
1320
1321
1322
1323
1324
1325
1326
1327
1328
1329
1330
1331
1332
1333
1334
1335
1336
1337
1338
1339
1340
1341
1342
1343
1344
1345
1346
1347
1348
1349
1350
1351
1352
1353
1354
1355
1356
1357
1358
1359
1360
1361
1362
1363
1364
1365
1366
1367
1368
1369
1370
1371
1372
1373
1374
1375
1376
1377
1378
1379
1380
1381
1382
1383
1384
1385
1386
1387
1388
1389
1390
1391
1392
1393
1394
1395
1396
1397
1398
1399
1400
1401
1402
1403
1404
1405
1406
1407
1408
1409
1410
1411
1412
1413
1414
1415
1416
1417
1418
1419
1420
1421
1422
1423
1424
1425
1426
1427
1428
1429
1430
1431
1432
1433
1434
1435
1436
1437
1438
1439
1440
1441
1442
1443
1444
1445
1446
1447
1448
1449
1450
1451
1452
1453
1454
1455
1456
1457
1458
1459
1460
1461
1462
1463
1464
1465
1466
1467
1468
1469
1470
1471
1472
1473
1474
1475
1476
1477
1478
1479
1480
1481
1482
1483
1484
1485
1486
1487
1488
1489
1490
1491
1492
1493
1494
1495
1496
1497
1498
1499
1500
1501
1502
1503
1504
1505
1506
1507
1508
1509
1510
1511
1512
1513
1514
1515
1516
1517
1518
1519
1520
1521
1522
1523
1524
1525
1526
1527
1528
1529
1530
1531
1532
1533
1534
1535
1536
1537
1538
1539
1540
1541
1542
1543
1544
1545
1546
1547
1548
1549
1550
1551
1552
1553
1554
1555
1556
1557
1558
1559
1560
1561
1562
1563
1564
1565
1566
1567
1568
1569
1570
1571
1572
1573
1574
1575
1576
1577
1578
1579
1580
1581
1582
1583
1584
1585
1586
1587
1588
1589
1590
1591
1592
1593
1594
1595
1596
1597
1598
1599
1600
1601
1602
1603
1604
1605
1606
1607
1608
1609
1610
1611
1612
1613
1614
1615
1616
1617
1618
1619
1620
1621
1622
1623
1624
1625
1626
1627
1628
1629
1630
1631
1632
1633
1634
1635
1636
1637
1638
1639
1640
1641
1642
1643
1644
1645
1646
1647
1648
1649
1650
1651
1652
1653
1654
1655
1656
1657
1658
1659
1660
1661
1662
1663
1664
1665
1666
1667
1668
1669
1670
1671
1672
1673
1674
1675
1676
1677
1678
1679
1680
1681
1682
1683
1684
1685
1686
1687
1688
1689
1690
1691
1692
1693
1694
1695
1696
1697
1698
1699
1700
1701
1702
1703
1704
1705
1706
1707
1708
1709
1710
1711
1712
1713
1714
1715
1716
1717
1718
1719
1720
1721
1722
1723
1724
1725
1726
1727
1728
1729
1730
1731
1732
1733
1734
1735
1736
1737
1738
1739
1740
1741
1742
1743
1744
1745
1746
1747
1748
1749
1750
1751
1752
1753
1754
1755
1756
1757
1758
1759
1760
1761
1762
1763
1764
1765
1766
1767
1768
1769
1770
1771
1772
1773
1774
1775
1776
1777
1778
1779
1780
1781
1782
1783
1784
1785
1786
1787
1788
1789
1790
1791
1792
1793
1794
1795
1796
1797
1798
1799
1800
1801
1802
1803
1804
1805
1806
1807
1808
1809
1810
1811
1812
1813
1814
1815
1816
1817
1818
1819
1820
1821
1822
1823
1824
1825
1826
1827
1828
1829
1830
1831
1832
1833
1834
1835
1836
1837
1838
1839
1840
1841
1842
1843
1844
1845
1846
1847
1848
1849
1850
1851
1852
1853
1854
1855
1856
1857
1858
1859
1860
1861
1862
1863
1864
1865
1866
1867
1868
1869
1870
1871
1872
1873
1874
1875
1876
1877
1878
1879
1880
1881
1882
1883
1884
1885
1886
1887
1888
1889
1890
1891
1892
1893
1894
1895
1896
1897
1898
1899
1900
1901
1902
1903
1904
1905
1906
1907
1908
1909
1910
1911
1912
1913
1914
1915
1916
1917
1918
1919
1920
1921
1922
1923
1924
1925
1926
1927
1928
1929
1930
1931
1932
1933
1934
1935
1936
1937
1938
1939
1940
1941
1942
1943
1944
1945
1946
1947
1948
1949
1950
1951
1952
1953
1954
1955
1956
1957
1958
1959
1960
1961
1962
1963
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
2036
2037
2038
2039
2040
2041
2042
2043
2044
2045
2046
2047
2048
2049
2050
2051
2052
2053
2054
2055
2056
2057
2058
2059
2060
2061
2062
2063
2064
2065
2066
2067
2068
2069
2070
2071
2072
2073
2074
2075
2076
2077
2078
2079
2080
2081
2082
2083
2084
2085
2086
2087
2088
2089
2090
2091
2092
2093
2094
2095
2096
2097
2098
2099
2100
2101
2102
2103
2104
2105
2106
2107
2108
2109
2110
2111
2112
2113
2114
2115
2116
2117
2118
2119
2120
2121
2122
2123
2124
2125
2126
2127
2128
2129
2130
2131
2132
2133
2134
2135
2136
2137
2138
2139
2140
2141
2142
2143
2144
2145
2146
2147
2148
2149
2150
2151
2152
2153
2154
2155
2156
2157
2158
2159
2160
2161
2162
2163
2164
2165
2166
2167
2168
2169
2170
2171
2172
2173
2174
2175
2176
2177
2178
2179
2180
2181
2182
2183
2184
2185
2186
2187
2188
2189
2190
2191
2192
2193
2194
2195
2196
2197
2198
2199
2200
2201
2202
2203
2204
220

PARTS LIST

- 10 system
- 15 computer
- 20 display device
- 25 input device
- 30 input device
- 35 scanner
- 40 digital camera
- 45 memory card reader
- 50 internet service provider
- 55 internet
- 60 web site
- 65 customer
- 70 customer
- 75 data entry screen
- 80 image
- 85 selection button
- 90 selection button
- 95 selection button
- 100 label
- 105 label
- 110 label
- 115 numeral
- 120 indicator window
- 125 window
- 130 data entry string
- 135 label
- 140 selection button
- 145 selection button
- 150 label

155 selection button
160 label
165 data entry screen
170 label
175 label
180 label
185 label
190 data entry screen
195 data entry screen
200 data entry level
205 data entry point
210 data entry point
215 data entry point
220 data entry level
225 data entry point
230 data entry point
235 data entry point
240 data entry point
245 data entry level
250 digital camera
255 control button
260 display
265 button
267 selection item
270 selection item
275 selection item
280 selection item
282 button
285 navigation button
290 navigation button

295 button

Year	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	